SNAKE CREEK NATIONAL WILDLIFE REFUGE
COLEHARBOR, NORTH DAKOTA

NARRATIVE REPORT

JANUARY through DECEMBER, 1966

PERSONNEL

Refuge Manager	David C. McGlauchlin
Refuge Clerk	Vacant
Maintenanceman	Marvin H. Boots
Wetland Manager	Ralph F. Fries

TEMPORARY EMPLOYEES

Biological Aid	James Jessen	June 6 - Sept. 10
Laborer	Gary Eslinger	Jan. 1 - March 5
Laborer	Roland Koenig	April 4 - Dec. 31
Laborer	Jeffrey Stockdill	April 25 - Aug. 23
Laborer	Micheal Norland	Aug. 23 - Sept. 12

Contents

LAKE NETTIE REFUGE

EASEMENT DISTRICT III A

I. GENERAL

A. Weather Conditions

	Precipitation			Max.	Min.
	Month	Normal	Snowfall	Temp.	Temp.
January	0.16	0.60	2.0"	27	-37
February	0.09	0.59	1.0"	40	-10
March	0.33	0.76	3.0"	61	-10
April	0.81	1.24		72	12
May	1.39	1.96		90	24
June	5.55	3.38		89	40
July	1.55	2.48		95	49
August	2.82	1.86		90	43
September	0.26	1.41		90	30
October	0.49	0.80		78	16
November	0.13	0.65		48	-5
December	0.35	0.46	3.0"	42	-24
Annual Totals	13.93	16.19	9.0" Extremes	95	-37

The 22 year average for weather data is from Weather Bureau records as taken at Garrison, North Dakota. Present weather data are from Snake Creek Refuge.

Weather for the year was generally similar to 1965. Precipitation for the year was below normal; 13.93" was recorded in 1966 compared with the average of 16.19". June and August were above normal for precipitation, all other months were below normal. Snow cover the first part of the year ranged from two to six inches, and at the end of the year from none to three inches.

Temperatures were within the normal range, but a little more extreme than the past few years. High temperature recorded was 95 degrees July 30; there were several days with temperatures in the 90's, from May 21 to September 12.

Lowest temperature was -37 degrees on January 29; mercifully there was no wind. On January 9 we had a low of -5 degrees coupled with 30 to 35 mph winds. This is worse than the -37 degrees.

The worst storm of the year, and one that will not be forgotten for a long time occurred March 2 - 5. It started about 6 p.m. March 2, and lasted for 52 hours. There was heavy snow continuously, winds were in the 35 to 45 mph range, and again mercifully, the temperature did not drop below zero. Visibility all day on March 3 and 4 ranged from 20 to 200 feet. The storm finally blew itself out about 10 p.m., March 4. Drifts in tree plantings and sheltered places ranged up to 10 and 12 feet deep, all unprotected places were stripped bare of snow. Surprisingly it was possible to drive from refuge headquarters to the highway, and to any nearby towns, but it wasn't possible to drive into the towns. We had no observed loss of any wildlife following the storm, but certainly the birds must have been hard hit. White-footed mice were seen dead sometime later after the snow was gone. Apparently the wind stripped the snow cover on the ground, thus exposing them and killing them.

The second storm of the year occured June 24. We had a nice, slow, gentle rain in the morning with a measured 0.23" of precipitation. It started raining again in mid-afternoon, and in less than two hours we had 2.82" more rain. This filled up every pothole, slough and depression fuller than they have been for years. Snake Creek pool rose 0.5 foot following the rain. There was some damage to fences from washouts along the south boundary of the refuge. The county road crossing at the south end of the refuge washed out. The washout was 140 feet long with a six foot grade completely gone. During the storm a local REA (electric coop) truck ran off Hwy. 83 to avoid hitting a car and knocked down the refuge directional sign along the highway.

There was no apparent damage to wildlife following this storm. Probably some bird nests were flooded, particularly those on low ground. There was severe hail damage about 10 to 15 miles southwest of the refuge. Generally the benefits of the storm far outweighed any losses because sloughs were filled to capacity, and most are still holding water at the end of the year.

Last killing frost of the year was May 12 (24 degrees), first killing frost was October 1 with 24 degrees. There was a light frost on the ground on September 14, but the low was 32 degrees.

B. Habitat Conditions

1. Water

Snake Creek pool was at 1831.4 elevation at the beginning of the year. It dropped to 1831.15 by June 1, but June rains, particularly the heavy rain of June 24, raised the pool to 1831.61, about 0.2 foot higher than the previous high for the pool. The pool dropped slowly the rest of the year, to 1830.32 at freeze-up. Net loss for the year was 1.08 feet.

No water was discharged from Garrison Reservoir into Snake Creek pool because it wasn't needed until late in the fall. The State Game and Fish Department was still rip-rapping dikes on their area and didn't want any more water. Also we heard unofficially the Bureau of Reclamation does not want Snake Creek pool raised because it will interfere with the installation of their pumping plant.

At the end of the year Snake Creek pool is at 1830.3 elevation, Garrison Reservoir is at 1834.5 but will probably be several feet lower than Snake Creek in the spring. There will be little chance to get any water from the reservoir until mid-summer of 1967.

The State Game and Fish Department has no objection to raising Snake Creek pool back to 1831.6; this can be done any time the reservoir is high enough.

Ice went out of Snake Creek pool April 13, freeze-up came on November 8. Freeze-up was the earliest date recorded since there has been any water in the pool. Out of curiosity we worked up the following table. It was rather surprising to find we have only a little over six months of open water, or an average of 210 days.

Snake Creek Pool

Year	Break-up	Freeze-up	Open water
1962	April 22	December 8	230 days
1963	April 17	December 15	212 days
1964	April 18	November 20	186 days
1965	May 1	November 29	213 days
1966	April 13	November 8	210 days

In addition to the main pool, the rain of June 24 filled every slough with water, some with five or more feet in depth. There was excellent use made of all the major sloughs by ducks and geese for the balance of the summer and all fall.

The six inch water pump was used to pump water into the pond at the east goose pen, and two other wetlands. One slough, Pothole #1 in Sec. 1, is about six acres in size. It had about 18 inches of water pumped into it. Pothole #4 in Sec. 8 is about 33 acres; it had 15 inches of water pumped into it. Both were very nearly dry before pumping. They both had very good duck usage after pumping.

An inventory has been made of all wetlands, islands, and approximate shoreline on the refuge. With Snake Creek pool at 1830 elevation we have 192 wetlands, in addition to Snake Creek pool.

2. Food and Cover

Cover conditions are still adequate, although perhaps not quite as dense and heavy as the past two years. Sweet clover seeded in 1965 on retired cropland made a tremendous growth this year with most of it six to seven feet high. Grass, both tame and native, seems to be adequate for nesting cover. It was quite evident following the March blizzard that tree plantings were not adequate; all tree plantings were one solid snowdrift.

Island nesting studies tend to indicate that ducks prefer tame grass or "go-back" to native grass for nesting cover, at least native grass had the fewest nests. One reason maybe that old grass (previous year's growth) is usually well matted down with little chance for concealment by early nesting ducks (mallards and pintails). By mid-June alfalfa, sweet clover and annual weeds are usually up about one foot high, enough for concealment. This type of cover is well used by gadwalls, teal and scaup. Crested wheat grass, quack and brome usually have some "bunchiness" for concealment in old growth.

Greatest lack of cover is still brood cover in the water, but it is improving. I am still amazed at the way cattail and bulrush clumps are showing up on what was dry prairie only three years ago.

Aquatic vegetation didn't show as much progress in 1966, probably because of heavy carp disturbance. In every bay and sheltered area the water was turbid and roiled, with evidence of carp activity. Waterfowl use of the Carlson slough area (northeast corner of the refuge) was down considerably this year, very obviously because of severe carp infestation.

Farm crop yields were good in 1966. We have standing or shocked grain in every part of the refuge except among the islands. We learned the hard way that swathed millet next to a flooded white-top marsh is a power ful attraction for blackbirds. The millet was swathed by mistake, for winter feed. It had fair use by antelope and deer, and a big flock of horned larks and snow buntings. In the spring several thousand blackbirds moved in until the field was worked up. There was fairly good use of the millet by ducks in the spring.

II Wildlife

A. Migratory Birds

Very briefly, the refuge goals pertaining to waterfowl are:

1. Production of 1000 Canada geese per year.
2. Provide resting area, food for up to 5000 Canada geese in migration, as many White-fronted geese as possible.
3. Production of 4000 ducks a year, with emphasis on mallards, redheads, canvasbacks.
4. Rest and feed for 75,000 ducks in migration.

We have made a very slight start on the Canada goose production. There were seven nests on the refuge this year, with a production of 24 goslings, One new nest in Sec. 30 failed to hatch or was abandoned; it had four eggs when found June 21. Another new nest on island #60 was found. Three eggs had hatched, two were left in the nest. There was no sign of a brood, but a pair of geese were seen nearby several times with no brood; the assumption is they lost their brood.

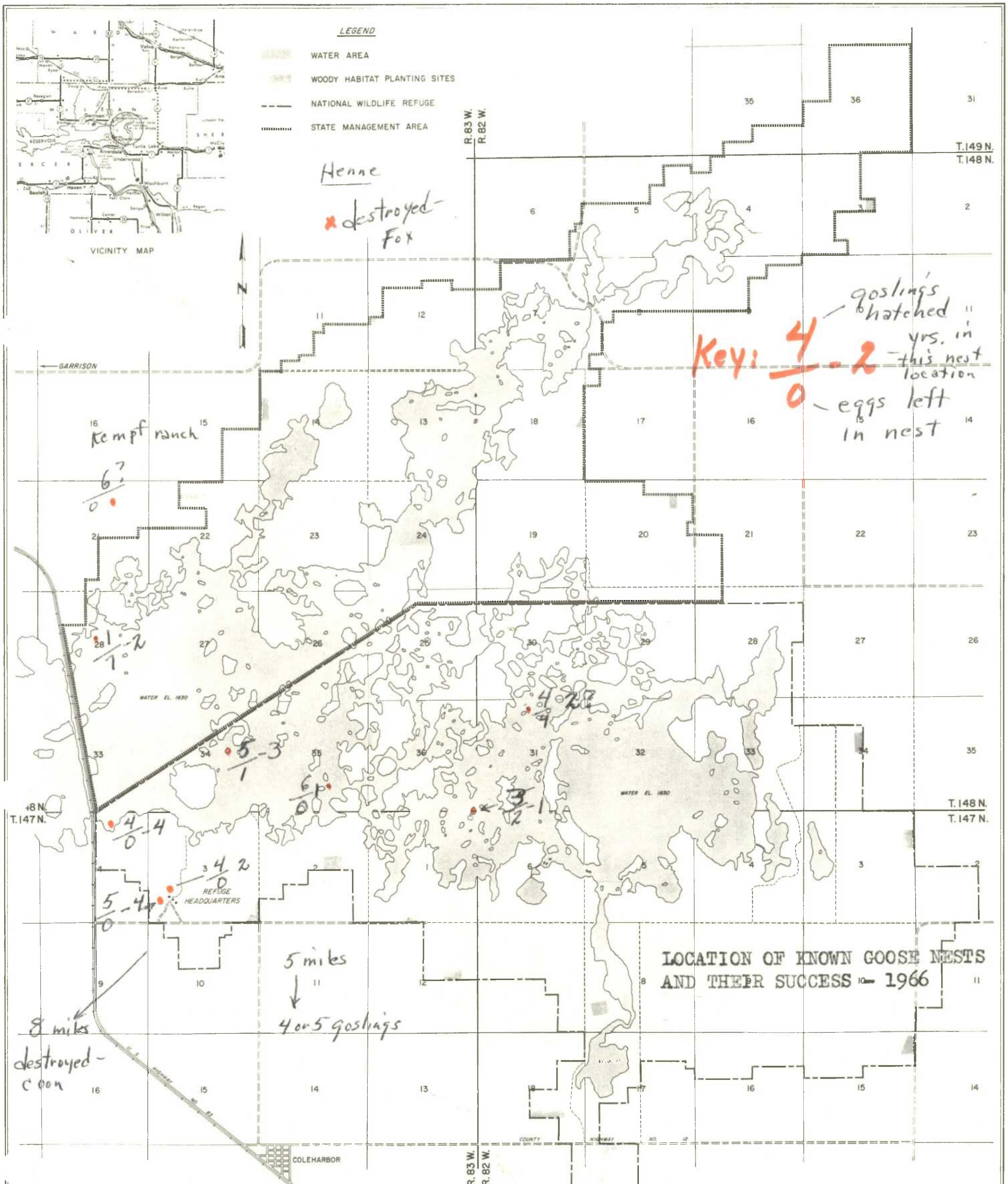
More discouraging was the fact that four pair of geese nested on private farm land around the refuge. Only two nests were successful. Apparently a pair of geese nested next to a large white-top slough on the Kempf ranch, in Sec. 21; they may have had a brood of six goslings. One pair tried to nest "right out on the open prairie" at the Margaret Henne place in Sec. 2, T148-R83 (about 4 miles north of the refuge). This nest was broken up, probably by a fox. Another pair nested on a slough at George Anderson's place, on Hwy 7, five miles south of the refuge; they hatched four or five goslings. Another pair tried to nest on an island in a stockpond at the Robinson ranch about eight miles southwest of the refuge. This nest was destroyed, probably by a raccoon.

SNAKE CREEK NATIONAL WILDLIFE REFUGE

McLEAN COUNTY, NORTH DAKOTA

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED IN THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

NOVEMBER 1964

FIFTH PRINCIPAL MERIDIAN

Scale 0 1000 2000 4000 6000 8000 FEET

TOWNSHIP DIAGRAM

MEAN DECLINATION 1960

Whistling swan use remained about the same as in 1965. A flock of about 100 swans were here for two weeks in the fall. A flock of swans was seen flying north over Garrison Reservoir, which is a rather unlikely place for them. Refuge habitat is still marginal for swans and bottom feeding ducks; there probably will not be any major increase in these species until the habitat improves.

Canada goose migration use increased to a new high this year, mostly on the basis of increased spring use. The migrating fall flock was about the same as in 1965. There were between 350 and 400 Canadas here in late March, the most we have ever recorded in the spring. The peak in the fall was 500 for large Canadas and 120 little Canadas. There is about a month's difference in the peak flight of little and big Canadas. The little Canadas come and go with the white-front flight, in early October; the big Canadas peak in early November.

One encouraging feature is that we had 26 non-breeding geese spend the summer here. For the past three years the non-breeding Canadas from our resident flock have been disappearing in April and not returning until September. The assumption is they have been going north with wild migrants. This summer we found a flock of 26 geese in the big slough at the south end of the big coulee (Sec. 17). This was at the end of the molt and the geese were not flying yet.

Total waterfowl days use, Jan. 1 - Dec. 31.

Year	Swans	Geese	Ducks	Coots
1960	112	20,783	1,024,450	165,950
1961	258	10,600	128,600	51,050
1962	0	30,050	1,494,520	176,620
1963	755	38,660	2,897,000	227,360
1964	1400	40,125	2,123,000	330,920
1965	1820	48,865	1,240,000	150,900
1966	1575	60,865	2,118,550	258,650

Peak numbers of waterfowl (fall migration)

Year	Swans	Geese	Ducks	Coots
1960	15	112	11,000	4,000
1961	40	108	1,100	500
1962	0	825	32,850	3,300
1963	75	850	86,270	8,000
1964	114	622	21,870	4,000
1965	50	500	19,500	3,000
1966	100	1050	17,175	5,000

Ducks

We had a good increase in duck use-days over 1965, and conparable to 1964. This was spread all through the year, in spring migration, summer use, and fall migration.

Major changes in species use are: green-winged teal down about 30%, redhead use down about 80%, and scaup use down about 60%. All other species showed an increase in use-days. The decrease in diver use is probably related to lack of aquatic vegetation, bottom invertebrates, and carp disturbance.

Our brood count techniques have not kept up with changes in habitat. Three years ago it was possible to literally count every brood on the refuge. Now we must go to a sampling count, and as yet have not found a representative sample that we can cover in time (we have a new route ready for use in 1967).

Even so, I am proud of the duck production figures for 1966. A total of 142 duck nests were found on 141 islands checked. This would roughly be about half of the total nesting habitat on the refuge. The student assistant counted 215 broods on about 95% of the refuge, but many broods could have been missed in heavy cover. A breeding pair count was made in May with 356 pairs of ducks on half the area. The problem was that pair counts, the nest search, and the brood count all covered various areas, with no correlation. This will be corrected in 1967.

The following information is taken from the student assistant's report.

Pair count, actual count	356 pairs
Area coverage	50 %
Projected total	700 pair
Nest search, actual count	142 nests
Coverage	10 % *
Projected	400 nests?
Brood count, broods observed	215 broods (929 yg.)
Coverage	95% **
Projected	300 broods

* Biased in favor of very best nesting habitat.

** Many broods missed in dense cover on potholes, and the early and late hatch.

From all the evidence a good estimate would be 300 broods raised on the refuge. There were 158 broods counted on the main pool and 57 on potholes. The number of broods seen on Snake Creek pool is very close to the number of nests counted.

The predominant broods were mallards, gadwalls and blue-winged teal. Gadwalls were much more predominant in open water, and blue-winged teal on the potholes. There were 14 broods of scaup and one ruddy brood seen, with no redhead or canvasback broods.

The main hatch of ducks came about July 15, with a range from June 10 (very late this year) to August 1.

The fall flight of all waterfowl was about normal. With all the sloughs on the east end holding water, ducks and white-fronted geese were spread all over the east end of the refuge, rather than concentrating on old Mud Lake as they normally do.

Freeze-up came unusually early (November 8), and forced out the remaining mallards by mid-November. The refuge flock of Canada geese hung on until December 3, when they left. Ducks and geese used the shocked barley in A-2, A-5, and A-6 units fairly well, but generally ignored shocked barley in A-9 unit.

Fp 9-66, xp 13, Dec. 66 D.M.
Barley shocks on A-2 unit, with a flock of mallards taking off.

Coots recovered from the 1965 low, but were still not too abundant. Both the peak population and use-days increased. There was little reproduction except in the northeast sloughs where they have some nesting habitat.

Water and Marsh Birds

Grebes were scarce on the refuge all year, except for a large concentration of Western grebes in late October. All four species of grebes declined in numbers and use for the spring and summer. Only two or three broods of Western grebes were seen, and James Jessen noted ten broods of eared grebes. Pelicans and cormorants were scarce during the spring and early summer, but gradually built up during late summer. By early September we had an estimated 400 white pelicans and 500 cormorants on the refuge. For the first time cormorants nested on the refuge. They took over island 7a in Sec. 35. There were 23 nests, with a hatch of about 35 young.

Great blue and black-crowned night herons were scarce most of the year. The black-crowned night heron colony again nested in the bulrushes in Carlson slough. American bitterns were common in fall migration, and for the first time we had a fair summer population. They could be heard "pumping" north of headquarters in June.

Soras were abundant all summer. Many were seen and flushed from uplands in September - they probably were feeding on grasshoppers.

Sandhill crane use increased this year, after a low in 1965. A flock of 50 stopped in the spring. One lone crane was seen several times around A-6 farm unit in May. First fall migrants were 18 in August, with a peak of 167 in September. There is no doubt that antelope hunting on the refuge limits crane usage; as soon as the antelope hunters move in the sandhill cranes move out. One unusual feature was that the sandhill crane migration did not peak in September as usual, but was prolonged through October with a final flight in November. Cranes remained in the area much later this fall.

Shorebirds, Gulls and Terns

On May 1 a long-billed curlew wandered around the refuge courtyard for two hours. This is a first record for the refuge. I had been expecting to see a long-billed curlew for several years; now the next goal is an eskimo curlew.

In general shorebirds were a little scarcer this year, probably because there were fewer bare shorelines and mud flats. Wilson's phalaropes were common on every slough. Franklin gulls continue to decline. We had 1500 in fall migration, compared with 3000 a couple years ago, and 30,000 six years ago. Franklin gulls are common on the refuge all summer, but have not been seen nesting yet.

Common terns nested again, on the islands on the east side of Mud Lake. Common and black tern numbers were stable.

B. Upland Game Birds

Because of miserable weather, and interference on one ground, we didn't get a complete sharp-tailed grouse count this spring. Sixteen grouse were flushed on ground 5; from other observations this seemed to be the average for that ground. Two were flushed from ground 7, but the State was trapping on this ground and apparently there was considerable disturbance. There was no sign of any activity on grounds 2,3,4 and 8. However grouse are seen quite often in the vicinity of ground 2, and in other areas where we have never been able to find a dancing ground. I have a strong suspicion that we have a number of discrete flocks of sharp-tailed grouse that do not necessarily use a dancing ground, or at least a ground in the area where they are usually located.

Gray partridge were very scarce at the beginning of the year, but apparently had good reproduction. The past two winters had been hard on the partridge. We have two covies of eight and eighteen in the headquarters area again, and several other covies around the refuge. They seem to be making good use of barley shocks - tracks are quite common around the barley shocks and the partridge are usually found there.

Pheasants also were almost eliminated on the refuge by the hard winters, but a few were seen this fall. The Riverdale Sportsmen's Club turned loose 100 hatchery pheasants along Wolf Creek during the summer, and these could be the ones we have been seeing on the refuge. One brood of seven was seen just south of the refuge along County road 12. A neighbor boy reported ten pheasants in one flock during the antelope season.

C. Big Game Animals

We haven't had a report of a State big game aerial count on the refuge since 1963. They did make an antelope count in September.

The refuge hasn't had a good reliable deer count since the winter of 1964 - 65. White-tailed deer observations were noticiably fewer all during 1966. The day before the deer season opened, on a trip around the refuge not one deer was seen. We had an estimated population of 35 to 40 deer. During the season (Nov. 11 - 20) 54 deer were killed on the refuge. This is not a true picture of the deer situation because many move into the refuge during the season. There were an estimated 20 to 30 on the refuge after the season closed, and at the end of the period.

The deer kill during the 9½ day season was:

Bucks		Does		Unidentified	Total
Adult	Fawn	Adult	Fawn		
26	10	12	2	4	54

Two deer were driven onto ice where they fell and injured themselves; both died.

For the last two or three years there have been no real good old deer killed on the refuge. We tried to age all deer checked this fall. Ages are not exact by a long ways but we came up with:

½ year (fawn)	- 11	2½ years	- 17
1½ years	- 16	3½ years	- 3

Fp 8-66, xp 1, Nov. 66 D.M.

A buck fawn, probably with a dislocated hip joint, injured from falling on the ice during deer season. It died later.

The antelope herd remained fairly stable. For the third winter we have about 42 antelope wintering in the headquarters area. There were none on the east end of the refuge until right at the end of the year another band of 40 moved in from south of Coleharbor. At the end of the year there was a total of about 85 on or near the refuge. The antelope bow season seems to have scattered the antelope more; we had several reports of antelope south and east of the refuge, towards Turtle Lake. These would be outside this antelope unit, but they very likely are from the Coleharbor herd.

The refuge was again open for antelope hunting. During the 9½ day season the kill was:

	Ad. Male	Kid Male	Ad. Female	Kid Female	Unid.	Total
Regular permit	9	1	5	0	2	17
Landowner permit	8	2	2	0	2	14
Total	17	3	7	0	4	31

There has been no loss from disease in either deer or antelope for at least two years now.

D. Fur Animals, Predators, Rodents and Other Animals.

There is still no sign of beaver on the refuge. Some of the cottonwoods and willows coming in along the shoreline are getting up so that in a few more years they will be large enough to support beaver. There had been some cutting on shoots but apparently this was muskrat activity rather than beaver.

Muskrats are increasing slightly. There is a house in the boat dock bay, the first muskrat house ever seen in that area, and perhaps a dozen houses in the Carlson slough. There are muskrats in a number of other areas, but they are all bank rats. It would be difficult to get a count because of the number of bank rats.

Mink are not as abundant as a year ago, or at least they were not as destructive to duck nests on islands. A few tracks are seen. Duck nest predation on islands was very low this year.

Raccoons are still fairly abundant. As far as we know they tend to stay along the shore line, and around the headquarters area when plums are ripe.

Skunks must be approaching a high population. Perhaps two dozen were killed during the year and at a guess we still have 100 to 200. There has been no incidence of rabies locally, but we have the mammalian population for it.

Red foxes are again very abundant, in spite of a heavy harvest locally last winter. Airplane hunters have been working on the refuge (illegally) at the end of the year, and this has reduced the fox population. There is an estimated 10 to 20 on the refuge now.

Jackrabbits are in a decline. They are still well scattered all through the refuge, but not as abundant as a couple year ago. There has been no control on the refuge.

Fp 7-66, xp 3, 9/66 DM

One refuge employee in his favorite role of predator control. He accounts for about a dozen skunks a year.

There are still a few cottontail rabbits at the Fox place. Two were seen when the dump was burned (the fire destroyed a fine sanctuary for them), and the remains of a freshly killed cottontail were found. There has been no sign of cottontails at headquarters for a couple of years now.

White-footed mice are still abundant, and a nuisance around the buildings. Our practice of grain shocking is a big benefit to field mice; every grain shock will have one to six mice inside.

E. Hawks, Eagles, Owls and Crows.

Our pair of winter resident golden eagles returned October 21 and have been seen irregularly since. Two bald eagles were seen November 9, but not during the deer season. It may not be very noble of our national emblem but the bald eagles used to scavenge gut piles from deer, but now the foxes beat them to it.

One osprey was seen hovering over Snake Creek embankment June 21; it later landed on one of the power line towers. This is the second osprey observation in this area.

There was a fair number of marsh hawks through here both spring and fall, but very few were seen during the summer. Red-tailed hawks were common in the spring, scarce in the fall. No peregrines were seen this year. Generally it has been a disappointing year for hawks.

By the end of last winter (1965-66) we had something like 33 snowy owl observations but at the end of 1966 we had only two snowy owl observations. One was taken in a pole trap at the goose pen-that was the end of the snowy owl observations. A great horned owl killed a goose in the pen, and was later caught in a pole trap. Generally horned owls have been scarce.

A new record for the refuge was a long-eared owl on November 11. The peculiar thing was that it was sitting on a rock out in open prairie, a mile from the nearest tree. The burrowing owls were not seen on the Hummel place, just outside the refuge this year.

It seemed like thousands of crows went through on the spring migration. At least three or four times the normal number were seen. Spring migration was spread over a two month period. By contrast very few crows were seen on the fall migration. The question has been raised as to why crows do not nest locally. Although this is not timber countryy there are still many small groves of trees, and tree plantings locally which should be adequate for nesting. However I am just as well satisfied that they do not nest here.

F. Other Birds

The only new record was a black and white warbler on May 17, in one of the tree plantings. Other observations: 31 robins in one flock in the refuge courtyard on April 29, and a dozen or more October 6 - 17, a palm warbler May 17, and 25 to 30 yellow warblers in one tree on May 21. The interesting thing about these observations is that eight years ago a robin or a warbler on the refuge was about as unusual as a hippopotamus.

G. Fish

There were no activities in fish management this year. It is obvious that carp are increasing, and are not improving waterfowl habitat. They have just about ruined the Carlson slough which used to be an excellent diver marsh.

Fathead minnows were noticeably absent or scarce until late in the summer. Fishermen were getting large perch and crappies on the State area, and northern pike up to 16 pounds. However most northerns run about two to three pounds. All fish are in very good condition.

Nothing has been seen of the white bass the State stocked in Snake Creek, or the walleyes. We have no information on 1966 stocking by the State except that they put a lot of northern pike fry in the pool.

H. Reptiles and Amphibians.

Because of the relative scarcity of these animals we have little to report. Chorus frogs and leopard frogs were abundant in many sloughs in the spring. We still have no record of snapping turtles on the refuge. Garter snakes were common during the late summer and fall.

III PHYSICAL DEVELOPMENT AND MAINTENANCE

A. Physical Development

We had no development money and there was no development work on the refuge this year.

1. Water Management

a. A dike 110 feet long was built across the neck connecting the Carlson slough area with Snake Creek pool, in Sec. 33. This was to primarily trap carp in the slough in the hopes we would get a winter kill, and also give us some control of water in the slough.

b. About three or four acre-feet of water was pumped into the new goosepen pool in Sec. 2. Due to a generous amount of rain in June and August pumping was necessary only once.

c. About 35 acre-feet of water was pumped from the main pool into the large 30 acre white-top slough in Sec. 8. Heavy rains also brought this slough up another six inches; it is still holding water at the end of the year. It had excellent duck use all summer and fall.

d. About eight or nine acre-feet was pumped into the slough on the section line between Secs. 6 and 7. It also had good duck use.

2. Roads and Trails

a. A one and a half mile tour route was graded up along the shore from the boat dock bay east to the Wallace Meiers road. It gives us about a three mile tour route from headquarters through a fairly good area.

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Mc LEAN COUNTY, NORTH DAKOTA

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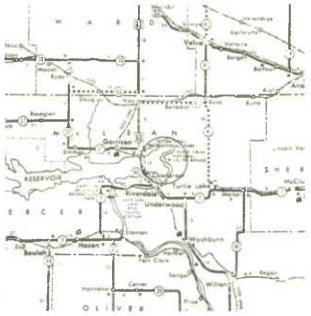

VICINITY MAP

LEGEND

WATER AREA

WOODY HABITAT PLANTING SITES

NATIONAL WILDLIFE REFUGE

STATE MANAGEMENT AREA

R. 83 W.
R. 82 W.

T. 149 N.
T. 148 N.

T. 148 N.
T. 147 N.

GARRISON

WATER EL. 1830

REFUGE HEADQUARTERS

COLEHARBOR

COUNTY HIGHWAY NO. 12

SIGNS REPLACED, TRAILS AND DIKES BUILT, 1966

Dike —

Trail —

Signs -

COMPILED IN THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

NOVEMBER 1964

FIFTH PRINCIPAL MERIDIAN

Scale 0 1000 2000 4000 6000 8000 FEET

TOWNSHIP DIAGRAM

MEAN DECLINATION 1960

Fp 3-66,xp 5, Mar. 66 D.M.

Pumping water from main pool into the goose pen with the six inch pump. About 48 acre-feet of water was pumped during the summer.

b. A temporary crossing was made on County road 12 after it was washed out, three miles east of Coleharbor. Raymond Nelson, local farmer on the south side of the refuge couldn't get to his farmland on the east side of the washout, and of course there was no traffic through. We gained quite a few points locally by opening this road for traffic instead of waiting for the county to repair it. The county later added more fill, but the present intention is to wait for Master Plan development, to complete the job. A cooperative agreement with the county would be the logical way to complete the job.

c. A fill was pushed in across the neck between sections 8 and 17, at the old Nordin place. This will give us quicker and easier access to the east end of the refuge.

d. Snow fence was put up along the road north of Fransens. We still had a good drift across the road in spite of snow fence and a row of Siberian elms. This will be a problem until the grade is built up.

e. All roads and trails were mowed and graded as necessary. The boundary fence trail should be extended around the south and east end of the refuge.

f. A landing strip 1500 feet long and 120 feet wide was graded and seeded just east of headquarters. It has a hump in the middle and a rise on the north end, but apparently is satisfactory. It has already been used four or five times in the six months since it was finished.

3. Fencing and Posting

a. A new 4' x 6' recognition sign was made and mounted along US Hwy. 83, just off Snake Creek embankment. This conforms to the latest word on refuge signs.

b. A 2½' x 5' directional sign was made and mounted on the highway opposite the road coming in to the refuge. This was later knocked down by a truck in the heavy rain of June 24 (the truck had to go into the ditch to avoid a collision with a car - the sign is about 15 or 20 feet off the highway shoulder).

c. A new directional sign was made and mounted at the junction of the two town roads just east of refuge headquarters.

d. The recognition sign at the main refuge entrance was repainted. This leaves us just the directional sign at Coleharbor and the recognition sign on the east end to rebuild, to conform to the new standards. They will be completed in 1967.

e. One half mile of the fence on the north side of the road, east of headquarters up to Fransens corner was moved up out of the road ditch. This had been a chronic problem with drifting snow breaking the fence down. Also we gave all of the boundary fence a good working over, patching wire and posts, and replacing boundary signs.

f. The closed area around headquarters was posted with special "Closed to Deer Hunting" signs. This seemed to help - we had no hunting in the closed area during the deer season.

g. Several corner and brace posts were welded up from six inch surplus steam pipe. This makes very good corner and gate posts.

h. The steel entrance gate on the Coleharbor road east of headquarters had to have some repair work. The Coleharbor Bar imported some "go-go" girls for entertainment. As a result of the boom in business at the bar, somebody stole a pickup outside the bar, came out the old road, turned the pickup around and backed through the refuge gate, went on down until they came to the pool. They then turned around and drove out again. The pickup was later found, with no damage to it, but our gate had quite a bow in it. The same party ran out of gas with the pickup, then went back to the bar and borrowed another car. This was abandoned in Garrison.

4. Buildings and Structures

a. Ceramic tile was put on the toilet wall and around the drinking fountain in the office. This improved the appearance considerably, and makes it a lot easier to keep the walls clean.

b. Chimney flashing was patched again at the residence for about the third time.

c. The septic tanks at the office and residence were pumped out in April. This is the first time the tanks have been cleaned out since the place was built (1958), and it was done voluntarily without waiting until they were full.

d. Exterior of all buildings was painted except trim which was painted in 1965.

e. Window wells at residence were raised and cemented to the wall. Half an inch of rain would fill them before.

f. Both the overhead door in the shop and one at the residence garage have dry rot and will have to be replaced soon. These are only eight years old and it seems ~~like~~ as though they should last longer than that.

g. A new steel exterior access door was hung to replace the plywood door on the steel equipment shed. The old door had detriorated pretty badly.

5. Equipment

a. The hydraulic system on the front-end loader on the Oliver tractor was changed from hose to steel pipe. The main purpose was safety, in moving the hydraulic lines away from the foot rest, and doing away with looping flexible lines which were a hazard.

b. The steel tank on the trailer mounted sprayer was replaced with a fiber glass tank. The old tank was rusting out, and rust was continually clogging the sprayer jets.

c. A new base was made for the 2" Gorman Rupp pump, and it was mounted on a two-wheel trailer we got from the Game Agents.

d. One of the surplus army assault boats was remodeled as a passenger or tour boat. A steering console and seats were installed, along with three inches of styrofoam in the bottom, and a 40 hp outboard motor. It is adequate, but typical of most remodeled surplus property, it isn't as good as a specific commercial product.

e. A new master clutch was put in the Caterpillar road grader. This makes the third clutch we have put in, in about 570 hours of operation. The Caterpillar company says that in this particular model (1941 - the first of the Model 12 graders) we can just expect to replace the master clutch every 200 hours.

f. Routine maintenance and service work was performed on all equipment as necessary. We got a little behind in the rush last year, and farmed out maintenance and repair work on the Studebaker to a local garage. Quality of the work was poor.

B. Plantings.

1. Aquatic and Marsh Plants

No planting of this type in 1966. No surveys were made of success of previous plantings, or volunteer growth, but it was obvious emergent and moist soil plants are volunteering and expanding, but submerged species were not as obvious as in 1965.

2. Trees and Shrubs.

A number of red cedar, buffalo berry, honey suckle, dropmore elm, and spruce were replanted in the south tree planting as replacements. Six Pfitzer junipers were planted around service building and residence, and a row of cotoneaster were planted on the west side of the residence as a hedge. Survival was good with all trees.

3. Upland Herbaceous Plants.

The south half of old A-9 farm unit, in Sec. 8, was seeded to crested wheat grass and sweet clover in late fall. The proportion was six lbs. of grass seed to two lbs. of clover seed. We tried the recommended practice of seeding in stubble just before freeze-up. We had a light rain just as the seeding was completed, but not enough to germinate the seed.

In addition to this, the dikes and crossings constructed during the last two years were seeded to crested wheat grass.

4. Cultivated crops.

This was another good year for cultivated crops. A late spring made for a slow start, but heavy rains in June provided enough moisture to bring crops through.

All crops grown were by permittee farmers. Total acreage is still kept at 2350 acres. We have a 1670 acre wheat base with the local ASC office, but retain only 500 acres; the balance is turned in to the national pool.

Two permittees put in 36 acres of corn, which was kept as refuge share. It made a pretty fair crop. Half was picked and stored for winter feed for the geese and for bait. We also had 20 acres of millet planted for refuge share; 15 acres was cut and shocked for wildlife use, and five acres combined. Of the 15 acres, seven loads were hauled out and stacked along with flax straw and alone for wildlife use around sloughs, and for possible nesting.

Two permittees put in 42 acres of flax, to see if antelope and grouse would use it during the winter. As of the end of the year there had been very little use of the flax, mostly because the antelope had moved out of the refuge in the areas where the flax was.

Refuge share of barley from A-2 unit, A-6, A-5, and A-9 was cut and shocked for winter feed. No wheat was shocked this year, wildlife use in 1965 didn't justify it. I am convinced that shocking barley is well worth it; antelope, mallards, Canada geese, deer, partridge and grouse all make use of barley shocks in about that order.

There was some damage to crops on the southeast end of the refuge, particularly in A-10, 17, 19 and 26, from hail and flooding, but loss was not serious. Wheat yields ran from 17 bushels per acre to 30; barley went from 20 bushels to 40 bushels per acre. Five acres of millet which was combined ran about 20 bushels per acre.

As of the end of the year we are not getting full utilization of the refuge share of crops as we were a few years ago, by wildlife. The farming probably could be reduced by about 1000 acres except that we would run into a storm of protest from the permittees. If we wait a few years the Garrison Diversion project will reduce it for us with no problem from the permittee.

C. Collections and Receipts.

1. Seed or Propagules.

a. We took 350 bushels of barley from A-26 unit as refuge share, to fill up the grain bin. It will be used for feeding the captive flock of geese, and for bait.

b. Five acres of millet were combined, for about 100 bus. of grain.

c. Eighteen acres of corn were picked, for about 300 bus. of ear corn, to be used for feed and bait.

2. Specimens.

a. One dead golden eagle was picked up at Fort Totten Trail park following the March blizzard. It had apparently died during the storm and was rather light in weight. It was turned over to M&E for disposal.

b. Twelve plant specimens were collected, identified and pressed during the summer, for the herbarium.

c. Two deer were picked up during the deer season after falling on the ice. Both died and they were used for fox bait. Another deer shot but not taken by the hunter was turned over to the Garrison Hospital.

D. Control of Vegetation.

There were two classes of chemical control of vegetation - the routine spraying of annual weeds in small grain crops by the farm permittees, and two applications of Simazine pre-emergent herbicide in the tree plantings by the refuge.

The farm permittees treated about 600 acres of grain in June with 2,4-D. The universal application is about 2/3 pint of 2,4-D per acre, in water carrier, by ground sprayer. Since this is to the farmer's benefit to spray his crops he usually is pretty careful; we have had no problem with this type of herbicide application. If anything, a few permittees are a little lax in application. The weeds controlled are wild mustard, wild buckwheat, and any other annual weeds. Control is better than 90% effective if applied at the right time.

We tried Simazine for the first time in the trees in early spring. By mid-summer it was difficult to say whether it was effective; we had no untreated areas as a control, and were also cultivating the trees. By late summer there seemed to be fewer weeds in the rows than other years. The Simazine was applied with the refuge ground spray rig as soon as we could get around in the spring, but this may have been too late then. There were a few weeds beginning to emerge then, and there was very little precipitation to carry the chemical into the soil.

A second application was put on in the fall, just before freeze-up. In both cases the application rate was five lbs. per acre, with water as the carrier.

The leafy spurge plot in Sec. 4 was not treated this year; there was no apparent growth until late in the summer. In fact by mid-summer we were having trouble finding the location of the patch. This is a good testimonial to the efficacy of Tordon 22K.

We do not have cost figures on the permittee application of 2,4-D but it would be about as follows:

Treatment	Application	Labor	Equip.	Chemical	Total Acreage	Total Cost
2,4-D - grain	gd. spray	est.	$1.00 per	acre	600	$600.
Simazine - trees	gd. spray	44.16	5.50	98.00	8	147.16

E. Planned Burning.

There were no fires, planned or accidental, on the refuge.

IV RESOURCE MANAGEMENT

A. Grazing.

The three grazing units are in good to excellent condition, at least as far as grass is concerned. They are in fair to poor condition as far as wildlife is concerned. Water seems to be the problem - all grazing units have wetlands in them, but the amount and duration of the water determines the amount of wildlife use.

G-1 grazing unit had a maximum of 31 cows and calves in for four months, which is way overstocked, and in violation of the grazing stipulations. This will be reduced in 1967. However the pasture is still in good shape - the cows spent quite a bit of time in and around the slough on the east end, so it isn't too overgrown. This slough also had good duck use, and even a pair of geese spent about a month on it.

G-3 unit had 18 cows and calves for four months. This unit has the poorest wildlife use, probably because it is the poorest for water, even though it has a spring. The poor quality of water in the spring and in the small slough north of it is not too attractive to waterfowl; there were 23 ducks on three wetlands in the unit on the breeding pair count.

G-2 unit had 12 cows for two months, in May and September. This is fairly light grazing (the unit is set up for 32 AUM's) but the grass is still only fair. Probably the poor quality of the soil is responsible for the light cover; if there were no grazing at all the grass would still be thin and scanty. There was quite a bit of water on this unit after the June 24 storm, and duck use was very good.

The Corps of Engineers continue to collect the grazing fees from the permittees directly. The permittees pay for the maximum allowable AUM's, whether used or not. The rate for G-1 was $1.41, for G-2 $2.05 and for G-3 98¢ per AUM.

B. Haying

There was no haying on the refuge, except for roads and trails, and the landing strip. We did mow the two sharptail dancing grounds in Sec. 10 and 8 (grounds 5 and 8).

C. Fur Harvest

After all the trouble of trying to talk someone into trapping, going through the red tape of a fur management plan, and general lack of interest, I gave up on any fur harvest. This fall we did have a few inquiries about fox trapping and shooting, because the price of fox pelts were up, but this interest will not last long.

Because fox prices have been up, fox hunters have been using planes, hounds, and snow-cats to take them locally.

V Field Investigation or Applied Research.

A. Captive Goose Flock

Only two of the original pinioned geese from the Erickson flock are still here. Both had been mated with free-flying geese, but one lost her mate and didn't nest in 1966, the other did. She hatched and raised four goslings in the goose pen.

We still have eight of the 1964 hatch of geese from Sullys Hill, and seven of the 1965 hatch. The 1964 geese should be breeding this coming year. Nineteen non-flying geese were rounded up and put in the equipment shed for the winter. Most of these had been weighed both winters; the results are tabulated here.

Band No.	Hatch	Status	Weight 12/17/65		Weight 12/7/66		Gain or Loss	
578-52816	1964	Pin.	9 lbs	7 oz	11 lbs	0 oz	1 lb	9 oz
815	1964	Pin.	7	8	8	12	1	4
817	1964	Pin.	9	14	11	10	1	12
818	1964	Pin.	9	0	11	2	2	2
189	1964	W.C.	10	15	12	2	1	3
190	1964	W.C.	12	4	12	8	0	4
193	1964	W.C.	10	14	12	4	1	6
199	1964	W.C.	7	12	9	8	1	12
824	1965	Pin.	12	13	12	4	-0	9
825	1965	Pin.	10	12	11	0	0	4
830	1965	Pin.	11	12	12	2	0	6
829	1965	Pin.	12	1	11	12	-0	5
826	1965	Pin.	10	0	10	4	0	4
831	1965	Pin.	10	3	9	6	-0	13
827	1965	Pin.	11	9	11	2	-0	7
100	1959	Pin.	7	14	9	10	1	2
176	1964	W.C.	8	5	9	12	1	7
Average weight:			10.2 lbs.		10.6 lbs.		gain 12 oz.	

B. Nesting Island Study.

Jim Jessen, the student biological aid, checked most of the islands for duck nests this year. The purpose of this study is to determine how much use is made of islands, perferred size of island, preference in nesting cover, predation if any on islands, and hatching success.

Very briefly, the results were:

Duck Nests Found on Islands

	Cover type						
	native prairie		Go-back		tame grass		Total Checked
	No.	%	No.	%	No.	%	
Islands checked	58	41%	41	29%	42	30%	141
Nests found	44	31%	57	40%	41	29%	142
Islands w/ nests	27	38.5%	23	32.8%	20	28.7%	70

There are 170 islands on the refuge, but 29 of the largest were not checked because of the difficulty of covering them thoroughly. Gadwalls were the most abundant nesters on islands. They showed little preference for cover type. Apparently, from this and earlier checks, the size of the island is most important, frequency of small islands is second, and nesting cover is third.

A follow-up in late July was made to determine nest fate. Only 43 of the original nests were located. (The recheck was not complete but covered only 60% of the islands). Of the 43 nests located, 36 had apparently hatched, six nests had been abandoned and one destroyed, probably by mink. One nest may have been abandoned because of rising water. Four abandoned nests were scaup nests.

Jim found that there was a ratio of 91.2 nests : 100 islands in 1964, based on 104 nests found, compared with 100.7 nests : 100 islands in 1966, indicating an increasing use of islands.

Nesting use of smaller islands was at a much higher rate than of larger islands. Islands up to one half acre in size usually averaged as many nests as those islands from on to five acres. The majority of small islands contained nests regardless of the cover type of vegetation.

If nothing else, this island study has shown that the maximum number of small islands, of 1/10 acre or less, will produce the maximum number of ducks. Tame grass (brome, quack or crested wheat) is as good as anything for nesting cover.

C. Banding.

Goals for banding for Snake Creek are:
Mallards: 500 pre-season
Blue-winged teal: 100 pre-season
Canada geese: As many locals as possible.

These goals were determined by the Division of Wildlife Refuges and Management and Enforcement. In addition, Area Biologist Hammond and myself feel we should band as many migrant white-fronted geese as possible. I also would like to band some of the migrant Canada geese; this flock is increasing, and we know nothing about it in relation to the refuge.

Results of the summer drove trap banding are:

Mallards	6	Shoveler	5
Green-winged teal	87	Scaup	1
Blue-winged teal	417	Wood duck	1
Pintail	80	Coot	44
Gadwall	15	Total	656

Local Canada geese banded were:

Im male - 8	Ad male - 1	SA male - 1
Im female - 6	Ad female - 1	SA female - 2
Total - 19		

Costs of banding are approximately $54 for labor, $12 depreciation on trapping equipment, and $3.60 for equipment operation, for a total of $69.60 for 19 geese banded.

Cost of banding ducks included: Labor $313, Equipment $19.40, Transportation, etc. $8.90, for a total of $341.30.

Band recoveries, for 1964 - 1966 bandings and recoveries (1966 assumed to be incomplete):

Mallard	9 recoveries / 156 banded = 5.8%	Gadwall	3 recoveries / 58 banded = 5.2%
Pintail	18 recoveries / 665 banded = 2.7%	Widgeon	2 recoveries / 60 banded = 3%
BW teal	2 recoveries / 506 banded = .39%	GW teal	3 recoveries / 314 banded = .95%
Redhead	0 recoveries / 11 banded = 0%	Coot	2 recoveries / 258 banded = .77%

D. Refuge Tinkering

We were able to get a quantity of flax straw from a local farmer for the hauling this fall. Eight truck loads were hauled and dumped adjacent to five sloughs and three shallow bays of the main pool. Later the straw was pushed out on the ice, forming a stack about six feet high and the general dimension of the truck box. These were located in protected areas of about one to two feet water depth. The purpose is to see if geese and ducks will use them for nesting. Flax straw was used because it is tough and durable, and should last for a couple years.

The stacks were located on a map, photographes taken, and they will be checked for waterfowl use.

In addition seven millet-barley stacks were made in sloughs on the east end. Millet bundles were used for the base and were topped with barley bundles.

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Durum stack at the Sandberg place. This had some sharptail use during the 1965 - 66 winter. A similar stack in water had very good duck use.

VI Public Relations

A. Recreational Use

In comparing the 1966 recreational use with 1965, there is a 68% increase in hunting use, and a 59% increase in total recreational visits. Recreational use is limited to deer and antelope hunting, sightseeing, and a little bird-watching and photography. Just plain driving in to see something comprises better than half of the recreational use.

We got a tour road of a sort completed, and have been sending some sightseers over that. We have been trying to open up more of the refuge to this type of thing when compatible with the objectives.

B. Refuge Visitors

Date	Name	Organization	Purpose
1/3	B. Daugherty	F.M.S. Bismarck	Fish Management
1/4	D. Diedrich	Salesman, NW Equip.	Selling, visit
1/6	J. Seeger	Co. Park Board	visit
	P. Handy	Garrison Dam Hatchery	Rental Survey
	W. Schmidt	R.O.	" "
1/7	B. Meiers	G&F Dept. Riverdale	Financial Report
2/10	H. Pochant	Coleharbor)	equipment for
	C. McCray	")	Coleharbor
2/16	J. Boelter	State Surplus Agency	Pick up property
2/18	H. Bradley	Des Lacs Refuge	deliver property
2/24	A. Klain	Turtle Lake	grazing, L. Nettie
2/28	Mrs. L Carlson	Ryder, N.D.	clerk position
3/9	W. Boots	Garrison	visit
	W. Hill	"	"
3/14	G. Murray	M.C.A. Minot	predator control
3/18	R. Koenig	Underwood	clerk position
4/8	Mr. Hoyle	"	visit, bird watching
4/16	B. Barnes	Coleharbor)	water problems,
	D. Bratz	)	Coleharbor
4/18	E. Zahn	M.C.A. Velva	Predator control
	G. Murray	" Minot	" "
4/24	J. Martin	Washburn	contract spraying
4/26	J. Stockdill	Garrison	summer work
5/20	E. Doeling	R.O. Engineering	Lost Lake Refuge
6/1	I. Nelson	Sullys Hill Refuge	Millet, surplus prop.
6/8	G. Murray	M.C.A. Minot	pick up traps
6/22	R. Ostlie	GSA, Minneapolis	visit, surplus prop.
	T. Evans	PDO, Minot AFB	" "
	Salesman	Dow Chemical	Tordon demonstration
7/6	F. Cassell	NDSU	Tour of refuge
	6 students	"	" "
8/22	J. Brown	M.C.A. Minot	visit
	H. Ruhland	Garrison	grade repair Co. road
8/29	E. Smith	R.O. Refuges	Inspection
9/14	M. Mansfield	Slade Refuge	Information

9/21	A. Tunison	C.O. Deputy Comm.)	Inspection
	R. Burwell	R.O. Director)	"
	V. Ecklund	B.O.R. Denver)	Refuge recreation
	C. Tulloss	" ")	in relation to
	E. Lauck	" ")	Missouri valley.
10/23	P. Stewart	CE, Omaha)	Tour of refuge
	V. Cole	" ")	" "
	D. Kopp	CE, Riverdale)	" "
10/20	M. Cunningham	Garrison	" "
10/21	M. Boots	Coleharbor	" "
10/25	E. Crozier	R.O. Refuges)	Master planning
	L. Kowalski	R.O. Engineering)	" "
11/1	J. Seeger	Co. Park Board	visit
11/4	G. McClure	GMA Bismarck	waterfowl, enforcement
	T. Hendrickson	G&F Dept.	" "
	H. Spitzer	" "	" "
11/12	J. Fransen	Coleharbor	Tour of refuge
	R. Hultberg	"	" "
11/15	J. Bauman	Refuges, Bismarck	Garrison Diversion
11/19	K. Telenga	Coleharbor	Tour of refuge
11/29	P. Hagquist	R.O. Engineering)	Survey work, master
	R. Kist	")	planning.
	L. Dennis	")	"
11/30	M. Boots	Coleharbor	Information on refuge
12/6	K. Wilhelm	R.O. Engineering	Survey work
	B. Gondringer	Turtle Lake	Grazing, L. Nettie

In addition to the above, G. Enyeart of the Game and Fish Department at Riverdale, personnel from the Minot AAO, all three Federal Game Agents, Harry Jensen, farm permittees, and various local people were in too many times to record.

We haven't kept a count but the number of Sunday afternoon drivers, fishermen and hunters in asking for information and similar visitors continues to increase.

Duane Meissner, Biology teacher at Garrison High School, again brought his high school biology class out six at a time, to watch sharptail grouse on the dancing ground. Because of bad weather they were limited to only three visits.

C. Refuge Participation

1/23 - 29 McGlauchlin attended RO Conference, Minneapolis.
2/14 - 3/2 McGlauchlin and Boots - Red Cross First Aid Course, Garrison Hospital.
2/18 McGlauchlin attended N.D. Chapter meeting Wildlife Society at Jamestown. Entered 4 Snake Creek photos in exhibit at meeting.
3/30 - 4/1 McGlauchlin attended Wetland Coordination meeting at NPWRC, Jamestown.

4/7	McGlauchlin attended retirement dinner for H. Jensen, Bismarck.
6/8	McGlauchlin - meeting with GMA McClure, G. Enyeart at Riverdale on farming practices - waterfowl regulations.
7/15	McGlauchlin attended meeting at Turtle Lake on Garrison Diversion recreation planning, by invitation of County Park Board.
7/16	Boots and McGlauchlin families attended Lower Souris picnic at Lower Souris.

Marvin Boots is a member of the Riverdale Sportsmen's Club, David McGlauchlin of the Garrison Sportsmen's Club.

McGlauchlin has been acting as supervisor for four local high school boys enrolled in the State Extension course in Wildlife Management. This carries high school credit, and is outside their regular high school curriculum. It has taken quite a bit of time, but I hope the boys come out of it with a little better understanding of Leopold's conservation ethic.

Mark Cunningham, high school student from Garrison, spent a day on the refuge learning about our operations. Apparently, If I care to take the time for it, there is an unlimited number of local boys who are interested and would like to do this.

D. Hunting

The refuge was open to antelope hunting for 9½ days beginning September 16. The State issued 50 permits for this unit again. Because of discrepancies between the known kill and the number of permits in other years, we checked on most of the permit holders for this unit. We found, as we suspected, that there were a fair number of permit holders who do not hunt this unit.

	Permits	Hunted on refuge	Kill on refuge	Kill off refuge	Not successful
Landowner	21	16	13	6	2
Regular	29	18	17	2	10*
	50	34	30	8	12

* May have hunted in other units after first weekend.
Total local kill, of 50 permits: 38 antelope.

The refuge was open to white-tail deer hunting Nov. 11 - 20 (9½ days). The largest number of deer ever taken on the refuge was harvested this year. The pool had frozen over Nov. 8, so it was easy to work the islands; at least four deer were taken on islands. We had a problem with deer getting down on the ice and injuring themselves; two were lost this way.

The State had a closed area around the refuge for goose hunting again. This is the second of their proposed three year closure. It was closed to Canada geese only; other species could be taken. Generally the white-front kill was poor because they didn't fly out much.

Duck hunting was relatively good locally. For a change we had a full season of hunting, with a few mallards, on the reservoir right up to the end of the season.

E. Violations

We continue to have a problem with fishermen and boaters coming into the refuge from the State area. This is handled as in the past; they are warned, given a map and usually its the last we see of them.

We had no problem with deer hunting in the closed area, but three antelope hunters from Towner were caught just north of headquarters with an antelope. They were given a good lecture and escorted out of the refuge.

The major problem this year has been low flying aircraft and aerial fox hunting on the refuge. One plane was seen to land and pick up a fox which had been shot on the refuge but we couldn't get the number. The survey crew of engineers reported probably the same plane had spent some time over the east end of the refuge. One pilot was warned after we got his number. He had flown low over headquarters and circled over the goose pen and antelope herd. This is promarily a pilot education affair. Most pilots and aerial hunters are not aware of low flying or hunting restrictions on the refuge.

F. Safety

After never having had a lost time accident since the beginning of the refuge in 1955; this record was broken this year. One of the laborers while driving steel pipe with a manual post driver allowed the post driver to over balance. The post driver struck him on the head causing a scalp laceration and concussion. Our lost time record now stands at 73 days.

Hard hats were purchased to be used while driving posts with a manual post driver, and when more than one employee is available or circumstances permit the truck operated post driver should be used.

Two of our permanent employees took a Red Cross First Aid Course at the Garrison Hospital.

We are still improving on storage of equipment and keeping working areas clean to keep down on fire hazards.

VII Other Items

A. Items of Interest

1. Following the March 2 - 4 blizzard, two men walked up to the residence bright and early Saturday morning. They were caught in the storm Wednesday evening, and got stuck a couple times in trying to drive off the pool. They ended up sitting in their station wagon for 62 hours.

Fortunately the temperature never got below zero, they had plenty of clothing, a small propane tank in the car, and 31 perch.

We gave them breakfast, pulled their car in to headquarters and got it started (it was a mess inside) and sent them on their way to Dickenson.

2. The second "rescue" case came on a Sunday afternoon when a party of fishermen came in wanting to get into a fenced off area on the State area. Their boat was swamped on shore with three foot waves breaking on it, and they couldn't get off. The refuge boat was used to pull them off, but I got caught in a driving rainstorm before it was over. Meanwhile one of the fishing party got lost; he was later found sitting out the storm in a toilet on the area.

Along with this, two or three hunting parties became stranded on Mallard Island during the fall, but we ignore them as this is out of our area.

3. There has been more drainage activity in the refuge vicinity this fall than all previous years together. This is the result of continued prosperity for the farmers, higher land values and cost squeeze, and both BSFW wetland acqusition, and future BR land acquisition.

4. McGlauchlin, Boots and Koenig all collaborated on the report, with editing by McGlauchlin. Photos are by McGlauchlin, including printing.

LAKE NETTIE NATIONAL WILDLIFE REFUGE

MC LEAN COUNTY, NORTH DAKOTA

UNITED STATES
PARTMENT OF THE INTERIOR

FISH AND WILDLIFE
BUREAU OF SPORT FISHERIES AND WILDLIFE

Present acquisition area ....
Proposed aquisition.....
Waterfowl production.....
count areas

COMPILED IN THE BRANCH OF ENGINEERING
FROM AERIAL PHOTOGRAPHS AND SURVEYS
BY G.L.O., U.S.G.S

MINNEAPOLIS, MINNESOTA APRIL, 1962

FIFTH PRINCIPAL MERIDIAN

Scale 0 20 40 80 120 160 CHAINS
0 1/4 1/2 1 1 1/2 2 MILES

TOWNSHIP DIAGRAM

MEAN DECLINATION 1960

LAKE NETTIE REFUGE AND EASEMENT DISTRICT III A

LAKE NETTIE REFUGE

I. GENERAL

A. Weather Conditions

1. Water

Lake Nettie depends on run-off and precipitation for water. It appears that the local ground water level is probably the same as the lake elevation.

Water data for Lake Nettie is:

Month	Gauge	Surface Area (acres)	Capacity (a.f. est.)
January 1	17.70	385	800
May 26	17.60	385	800
October 4	17.86	385	800
November 3	17.85	385	800

This does not cover the large slough to the east, or small one east of the Krumwiede buildings. These would add about 220 acres of water area.

The cloud burst of June 24 dumped about five or six inches of water on Lake Nettie. Water supposedly ran in from the north for two days, and for the first time in at least seven years it ran over the natural spillway for Jarvis slough in Sec. 34. An interesting note is that after the heavy rain and two days run-off, the water level in the lake came up about 9".

Water conditions were excellent all summer, particularly in Jarvis slough.

2. Food and Cover

Cover conditions haven't changed noticeably. The bulrush jungles are still there, and high enough to provide some winter cover for deer. There is no farming on the refuge so winter feed could be a problem. However Lake Nettie probably supports more deer and pheasants over-winter than any comparable area, so it appears that winter cover rather than food is the answer.

I suspect there is a problem with summer food for waterfowl. Duck use was fairly good on the lake proper, but seemed to be relatively low on Jarvis slough. There is a dark brown humus stain in the water, and seems to be very little aquatic food available.

II WILDLIFE

A. Migratory Birds

Waterfowl use of Lake Nettie is erratic. Spring migration use never has amounted to much. Whistling swans usually stop in the spring and fall. Summer use by ducks was fairly good, and fall migration use was about average.

Results of the breeding pair count made May 26 are:

#1 Small alkali slough, west side Lake Nettie: 10 pair, 1 male
#2 Small slough east of Krumwiede bldg. site: 8 pair, 15 males
#3 Complete circuit Lake Nettie: 39 pair, 7 males
80 pair potential breeders

Also I had 64 ruddies, 28 male redheads, and 19 coots on Lake Nettie. No canvasbacks were seen. No brood count was made, because of lack of time. Based on brood count: pair count ratio for Snake Creek, production would be about 48 broods.

Other waterfowl counts during the year are:

Species	September 8	October 4	October 21
Whistling swan			5
Mallard			200
Gadwall	100		
B.W. Teal	25		
Widgeon		300	
Shoveler		40	30
Redhead	10		
Canvasback	20		120
Scaup	50	50	250
Ruddy	150		100
Coot	1000		20

It was impossible to get in to Jarvis slough because of high water all fall, but one or two hundred ducks more would be the most on that area.

B. Upland Game Birds

Only one pheasant was seen at Lake Nettie during the year, but there could be more. The road going in to the Krumwiede place is always good for pheasants, probably because it is fairly close to trees and John Forland's feed lot. A few sharptails are still seen along the north side of Sec. 16. No gray partridge have been seen.

C. Big Game Animals

Only a few deer were seen around the Krumwiede place, and we have no records of the total population. No apparent change, and a good estimate would be 10 to 20 deer.

D. Nothing unusual in fur bearers, reptiles, birds or other wildlife.

III REFUGE DEVELOPMENT

A. Physical Development

All of Section 16 was fenced by Leslie Forland. The refuge supplied the materials, and Leslie built 4 miles of fence, including four corners and four gates, for 3.5¢ per lineal foot. The refuge crew staked out the fence line first.

Posting was checked around the refuge and signs replaced as necessary. The entrance gate on the Krumwiede road was repaired, but otherwise there was no maintenance.

IV RESOURCE DEVELOPMENT

A. Grazing

Grazing is still a problem, and the acquisition of Sec. 16 has only aggravated it. We get a good grass cover developed for nesting cover and every stockman in the area is after it. So far we have held the line at the former land owners or tenants. There was no stock trespass by A. Klain this year, or very little if any.

Grazing was divided as follows:

Permittee	Unit	Area	Stocking Rate	Actual AUMs	Fees
L. Britton	Britton	320 a.	100 AUM	93.75	161.25
J. Forland	Sec. 16, 22	380 a.	152 AUM	220.00	308.40
L. Forland	Sec. 16, 21	240 a.	52 AUM	50.75	87.29
W. Swanson	Sec. 16	160 a.	64 AUM	40.00	38.71
		1100		405.5	595.65

The pastures in the lower unit, i.e. south of the county road, are exceptionally good with an abundance of cover. The pastures in Sec. 16 are fair. However this is poor habitat in the first place.

B. Haying

As part of the acquisition agreement, the tenants of Sec. 16 (three permittees) were allowed to cut hay there, and the northwest 80 of Sec. 21 for two years, to give them time to locate more hay land.

About 215 acres of wetland bottoms were cut, for $202.60 receipts. Total receipts for Lake Nettie were $798.60.

VII OTHER ITEMS

Les Forland, longtime resident at Lake Nettie mentioned that a Mr. Griffith, a former land owner of the Krumwiede tract, had been back for a visit last summer. The Griffith family has two children buried at the old homesite, just inside the gate in the NW¼ of Sec. 21 - 148 - 81. As far as I know there is nothing marking their grave.

Apparently the children died during the depression and there was no money for a funeral or cemetery lot.

EASEMENT DISTRICT III A

Camp and Strawberry Lake

The water level for Camp and Strawberry Lake probably doesn't fluctuate more than three inches the year round. There is always a trickle of water going over the spillway.

Water data for the year are:

May 26 - 1" water over spillway
July 27 - ½" water over spillway (est. water flow - 30 gpm)
Sept. 8 - ¼" water over spillway

Waterfowl use continues very poor. A few scaup use Strawberry Lake in migration, with an occasional teal in among the cottages. The upper lake gets more use, but it depends quite a bit on water conditions elsewhere.

The breeding pair count on May 26 showed this breeding population:

Mallard - 4 males 0 pairs		BW Teal - 1 male 3 pair	
Gadwall - 0 "	3 "	Shoveler- 1 "	0 "
GW Teal - 0 "	1 "	Pintail - 3 "	0 "

This is an indicated breeding population of 16 pair. Production would be on the order of 10 or 12 broods, which compares well with previous years.

Other waterfowl counts are:

Species	July 27	September 8
Gadwall	2 broods	20
Scaup	2 broods	
Mallard		6
GW Teal		7
BW Teal		12
Canvasback		1
Coot		115

There doesn't seem to be too much more activity in cottage development. The upper lake was staked out for lots a couple of years ago, but nothing more has been done.

I was much interested to learn (from Joseph Henry Taylor's "Sketches of Frontier Life") that the old Ft. Stevenson - Ft. Totten Trail ran around the upper end of Camp Lake. There were several murders and ambushes of mail couriers and other travelers of the trail. At the present time this is a quiet, peaceful little valley with no indication that it was far from being a refuge in the past.

Cottonwood Lake

Apparently since the plug was removed from the feeder ditch run-off has been more than enough to keep Cottonwood Lake filled. In June water had flowed over the road on the west side of the lake. The spillway and culvert are filled up and not functioning.

Water data is:

May 26 - Water at top of stop logs (had been over them, and road).
July 27 - Water 6" below stop logs.
Sept. 8 - Water 8" below stop logs.

With the higher water level the bay south of the outlet has become more attractive to waterfowl, and waterfowl use has doubled. I still had only 59 ducks on the breeding pair count.

Breeding pair count, May 26

Mallard	2 male	1 pair	Shoveler	1 male	0 pair
Gadwall	0 "	3 "	Pintail	1 "	1 "
GW Teal	0 "	1 "	Scaup	0 "	3 "
BW Teal	1 "	3 "	Ruddy	29 total	

17 potential breeders

At this time there was one American merganser, one pelican and one great blue heron there; so minnows must be abundant.

Jim Jessen found only three broods of gadwalls on July 27. According to the pair count there should have been about ten to twelve broods.

On September 8 there were 337 ducks and 140 coots on the lake.

Wintering River.

There was no significant change in water conditions here. June rains kept the country fairly well saturated and the pool full. The elevation of the natural spillway is given as 97.0 on the old Bureau of Biological Survey maps; this must compare fairly closely with our gauge reading of 1.06.

May 26 - 1.06
July 27 - 0.70
Sept. 8 - 0.00

Ideally the water should be about a foot higher in the marsh; this would open up the vegetation somewhat and improve it for divers.

This year, for the first time, we had no records of divers use except for two ruddies. Because of the thick cover it isn't significant. To get a good count on this area we need a tower in about the middle of the marsh, and time to use it.

Only six ducks were seen on the pair count, and no broods. There were 28 ducks seen September 8.

I have a note from the May 26 count: "About one pair of yellow-headed blackbirds for every four square rods". This figures out to about 7000 yellow-headed blackbirds on the 90 acres of marsh in the refuge.

Mr. Kronberg reported a large white bird crippled just east of the refuge in June. We took a crew up on the remote possibility it might be a whooping crane but it was an injured whistling swan. We made an effort to run it down but it had too much room.

Sheyenne Lake

After several years of very low water and exposed mud flats, Sheyenne Lake has come back. Run-off and flow through the valley has increased. For the first time since 1960 water was flowing through the culverts, and over the spillway. And for the first time in years there was good waterfowl use of Sheyenne Lake.

The only water record we have is on June 1, when water was 9" deep in the gauge culvert. At the time there was an estimated three to five cfs of water going over the spillway of Coal Mine Lake.

On the breeding pair count I have:

Mallard	8	males	10 pair	Redhead	0	males	9 pair
Gadwall	3	"	27 "	C'back	0	"	2 "
Widgeon	2	"	2 "	Scaup	0	"	3 "
GW Teal	3	"	2 "	Ruddy	1	"	15 "
BW Teal	11	"	35 "	Shoveler	7	"	11 "
Pintail	5	"	12 "	Coots		120	

168 potential breeders.

This is incomplete because part of the west end and some small bays could not be covered. Coverage was about 80% complete. The projected pair count would be about 210 pair; and production, using the Snake Creek ratio of pairs: broods, would be about 127 broods.

In addition to the pairs there were two flocks of 75 and over 100 redheads, and coots were too numerous to count. I also had 13 Western grebes, 100 pelicans, 12 - 15 cormorants, four pair of eared grebes, and much beaver and muskrat activity.

This lake, after a long drought, has come back to be one of the best diver marshes in the area. In a few years it will be a huge open water reservoir, courtesy of the Bureau of Reclamation.

SIGNATURE PAGE

Submitted by:

David C. McGlauchlin
(Signature)

David C. McGlauchlin

Refuge Manager
Title

Date: February 8, 1967

Approved, Regional Office:

Date: 2-9-67

Edward J. Smith
(Signature)

Regional Refuge Supervisor

3-1750
Form 1
(Rev. March 1953)

WATERFOWL

REFUGE Snake Creek Refuge MONTHS OF September TO December, 1966

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling					1	1	4	18	100	100
Trumpeter										
Geese:										
Canada	28	28	165	155	130	275	280	275	350	500
Cackling					120	50	40			
Brant										
White-fronted				600	700	700	400	85		
Snow						15				
Blue						3				
Other Ross' Goose						1	1			
Ducks:										
Mallard	650	650	2500	5000	10,000	12,000	10,000	7,500	7,000	6,000
Black										
Gadwall	150	125	800	2000	1500	800	600	150		
Baldpate			600	1200	1000	1000	800	400	300	100
Pintail	900	900	1000	2000	3000	2000	2000	500	100	
Green-winged teal	150	175	200	200	500	400	400	150	100	
Blue-winged teal	550	525	600	450	300	100	100			
Cinnamon teal										
Shoveler	10	204	600	400	400	400	200	200	150	200
Wood										
Redhead				25	50	150	200	150	120	100
Ring-necked										
Canvasback								2		50
Scaup	20	20	100	150	100	75	200	300	300	300
Goldeneye				20	35			30	50	150
Bufflehead			2	20	50		300	400	500	250
Ruddy		39	200	200	200	250	250	250	200	150
Other C. Merganser										10
Coot:	400	650	5000	4500	3500	2500	500	300		

INT.-DUP., D.C.-53824-59

3-1750a
C(. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Snake Creek Refuge MONTHS OF September TO December, 1966

(1) Species	(2) Weeks of reporting period 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimated total
Swans:											
Whistling	20								1,575		
Trumpeter											
Geese:											
Canada	280	300	200	120					21,400		
Cackling									1,470		
Brant											
White-fronted									17,400		
Snow									90		
Blue									18		
Other Ross' Goose									2		
Ducks:											
Mallard	4,000	3,000	300						480,200		
Black											
Gadwall									42,875		
Baldpate									37,800		
Pintail		50							87,150		
Green-winged teal									15,925		
Blue-winged teal									18,375		
Cinnamon teal											
Shoveler									18,000		
Wood											
Redhead									6,400		
Ring-necked											
Canvasback									300		
Scaup									11,000		
Goldeneye									2,000		
Bufflehead									10,860		
Ruddy									12,180		
Other C. Merganser									70		
Coots:											
									121,450		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	1,575	100	
Geese	40,380	1,050	
Ducks	743,150	17,175	
Coots	121,450	5,000	

SUMMARY

Principal feeding areas Swans: east end of S.C. pool.
Geese: farm units A-23, 24, 25, 19, 2, 3, 4.
Ducks: throughout refuge.

Principal nesting areas

Reported by David C. McGlaughlin

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1751
Form N. .A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Snake Creek Refuge Months of September to December 1966

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Eared Grebe			20 - 30	Oct.						
Western Grebe			200	10/24-11/3						200
White Pelican			400	Sept.	50	10/20				400
Double-crested Cormorant			500	Sept.	150	10/20				500
Great Blue Heron			5	9/16						12
Black-crowned Night Heron			50 - 100	Sept.	3	10/20				150
Sandhill Crane	167	9/7	167	9/7	15	Nov.				300
American Bittern			50 - 100	Sept.						100
II. Shorebirds, Gulls and Terns:										
Sora			12	9/16						15 - 20
Killdeer			8	9/16	0	10/17				15 - 20
Common Snipe	1	9/18	10 - 20	Sept.	1	11/3				40 - 50
Greater Yellowlegs			150	10/6	30	10/20				200
Ring-billed Gull			35 - 50	Oct.						50 - 100
Franklin Gull			1500	Sept.						2000

(over)

(1)	(2)		(3)		(4)		(5)	(6)
III. Doves and Pigeons:								
Mourning dove			50-100	Sept. 1	1	10/17		100
White-winged dove								
IV. Predaceous Birds:								
Golden eagle	2	Oct. 21	2	Oct.-Nov.				2
Duck hawk								
Horned owl	1	11/3	1-3	Nov.				3
Magpie								
Raven								
Crow			50-100	Oct.	2	11/9		100
Snowy Owl	1	11/18	2	Nov.	1	11/23		2-3
Long-eared Owl	1	11/11	1					1
Short-eared Owl	1	12/4	1					1-3
Marsh Hawk			15	9/18	1	Nov.		75-100
Sparrow Hawk	1	9/24	3	Sept.				3-5
Bald Eagle	2	11/9	2	11/9	2	11/9		2

Reported by.....

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. DC., WASH., D.C.

59317

3-175
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Snake Creek Refuge Months of September to December, 1966

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres Per Bird	Number broods observed	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Sharp-tailed Grouse	7000 a. prairie, tame grass, cropland								70 - 80	No count, random observations
Gray partridge	1500a. stubble and "go back".								50 - 100	Random observations, covies seen several times in same areas.
Ring-necked pheasant	2000 a. cropland, "go back", tree plantings.								10 - 20	One observation of 10 birds, during deer season.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, phesants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

*Only columns applicable to the period covered should be used.

3- 53
Form NR-3
(June 1945)

BIG GAME

Refuge Snake Creek Refuge Calendar Year 1966

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed deer	9500 a. cropland, "go back", prairie, tree plantings, sloughs.		52						2 (fell on ice)			75 prior to deer season.	35 - 40	
Pronghorn	8000 a. cropland, grassland, "go back".		30	*					1**			85	85	

* Includes two antelope taken just outside refuge boundary.

** 1 antelope reported dead during deer season - probably shot.

Remarks:

Reported by _____

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each</u> <u>species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1775
Form [illegible]R-5
60701

DISEASE

Refuge Snake Creek Refuge Year 1966

Botulism

Period of outbreak None seen.

Period of heaviest losses

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage)

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life

Remarks

Lead Poisoning or other Disease

Kind of disease None seen.

Species affected

Number Affected Species	Actual Count	Estimated

Number Recovered

Number lost

Source of infection

Water conditions

Food conditions

Remarks

NR-6

Bureau of Sport Fisheries and Wildlife

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge Snake Creek Calendar Year 1966

1. Visits

a. Hunting 285 b. Fishing 0 c. Miscellaneous 426 d. TOTAL VISITS 711

1a. Hunting (on refuge lands)

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl			
Upland Game			
Big Game	285	8500	Bureau
Other			

Number of permanent blinds None

Man-days of bow hunting included above None

Estimated man-days of hunting on lands adjacent to refuge 1500

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Ponds or Lakes		
Streams and Shores		

1c. Miscellaneous Visits

Recreation 426 Official 60

Economic Use 65 Industrial 5

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	On Refuge NO. OF GROUPS	On Refuge NUMBER IN GROUPS	Off Refuge NO. OF GROUPS	Off Refuge NUMBER IN GROUPS
Sportsmen Clubs			1	120
Bird and Garden Clubs				
Schools	2	10		
Service Clubs				
Youth Groups				
Professional-Scientific	1	7		
Religious Groups				
State or Federal Govt.				
Other				

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	1	Radio Presentations	
Newspapers (P.R.'s sent to)	4	Exhibits	1
TV Presentations		Est. Exhibit Viewers	100

3-1756
(Rev. 4/63)

3-1757
Form NR-7
(April 1946)

PLANTINGS
(Marsh - Aquatic - Upland)

Refuge Snake Creek Refuge 1966

Species	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline	Amount & Nature of Propagules	Date of Planting	Survival	Cause of Loss	Remarks
Red Cedar	Refuge headquarters shelterbelt	replacement	25	2 year seedlings	May			Survival will not be known until spring 1967.
Buffalo Berry	"		25	"	"			
Honey Suckle	"		20	"	"			
Dropmore Elm	"		10	"	"			
Spruce	"		25	"	"			
Pfitzer Juniper	Headquarters yard		6		"			
Hiawatha Cherry	"		1		"			

TOTAL ACREAGE PLANTED:

Marsh and aquatic_____
Hedgerows, cover patches_____
Food strips, food patches_____
Forest plantings_____

3-1758
For R-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of ldlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Snake Creek Refuge County McLean State North Dakota

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./ Tons	Acres	Bu. /Tons			
Wheat	478	11,957					478		478
Barley	313	8,388	10	350	293	7,325	616		616
Oats	37	1,565	0	0	0	0	37		37
Rye	36	700	0	0	14	280	50		50
Corn	0	0	15	300	21	420	36		36
Millet	0	0	5	100	15	300	20		20
Flax	3	57	0	0	39	585	42		42
Grass							45	Crested wheat & Sweet clover	45
								Fallow Ag. Land.	1,025

No. of Permittees: Agricultural Operations 11 Haying Operations None Grazing Operations 3

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle	44	176	None	354
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				2,349
Hay - Wild	None			2. Acreage Cultivated as Service Operation				None

DIRECTIONS FOR PREPARING FORM NR--8'
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only thenumber of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvesed column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops Specify the acreage kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting

Total Refuge Acreage Under Cultivation Report total land area devoted to agricultural purposes during the year.

3-157
NR-8a

REFUGE GRAIN REPORT

Refuge SNAKE CREEK REFUGE Months of January through December, 1956

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Barley	600	525	1125	240	0	585	825	300		300	
Corn (ear)	0	140	140	0	0	40	100	100		100	
Proso Millet	0	185	185	60	0	25	85	100			100

(8) Indicate shipping or collection points Coleharbor, North Dakota - Soo Line Railroad

(9) Grain is stored at Refuge headquarters granary

(10) Remarks

*See instructions on back.

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PERSTICIDE APPLICATION

Refuge: Snake Creek Refuge

Proposal Number:

Reporting Year: 1966

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4/7/66	pre-emergent weed control in tree plantings	three tree plantings in headquarters area	4	Simazine	15#	3 3/4 # / A.	water 40 gal. per acre	ground sprayer
June	wild mustard	refuge farming units	600	2,4 - D	50 gals.	2/3 pt. per acre	water 50 gal. per acre	ground sprayer
Oct. 27	pre-emergent weed control in tree plantings	three tree plantings in headquarters area.	4	Simazine	20 #	5 # / A.	water 40 gal. per acre	ground sprayer

10. Summary of results (continue on reverse side, if necessary)

Leafy spurge plot treated in 1965 with Tordon K, not treated in 1966, no new growth observed until late in summer.

Results of Simazine treatment in trees indecisive, no standard for comparison.

35500

Fp 2-66 xp 5, March 5, 1966 D.M.

Snow in garage following March blizzard. Every window in every building was like this.

Fp 6-66 xp 1, June 10, 1966 D.M.

Discing down the new landing strip east of headquarters. View is to north, from about the middle of the strip.

Fp 7-66 xp 2, Sept. 2,1966 D.M.

Sweet clover seeded on A-2 unit for cover along the pool. Growth is up to seven feet high. Excellent deer cover, also good for ducks, raccoons and foxes.

R 2 1966 D.M.

Duck nesting in fairly open cover on island, classified as native prairie.

Fp 6-66 xp5, June 1966 D.M.

View to southeast of county road washout. Since repaired by refuge and later by county. Grade elevation at the bottom is about 1842 feet, indicating about eight feet of water here at full pool.

Fp 6-66 xp 1, June 1966 D.M.

Looking west at the washout, three miles east of Coleharbor. Washout was 145 feet long and about a seven foot grade.

Fp 6-66, xp 21 June 1966 D.M.

Another view of the washout. We have tentatively proposed a joint County-Bureau dike, control structure and road crossing here, above the 1850 elevation.

Fp 1-66, xp 6 February 1966 D.M.

A fair sized perch taken in ice fishing on the State part of Snake Creek pool. No limit on these and some fishermen will get 50 to 100.

Fp 6-66 xp 9, June 1966 D.M.

Dr. Cassell and wildlife students from NDSU on tour of refuge. They were watching the refuge herd of antelope - their first chance to see antelope on the tour. A surprising amount of public use is primarily to see antelope. Many people have first seen antelope here on the refuge.

Fp 7-66 xp 4 Sept. 1966 D.M.

A successful antelope hunter draws a crowd of helpers and kibitzers. This is the way the boys learn how it is done. The boy on the right got his antelope on the refuge also.


NORTH DAKOTA
STATE UNIVERSITY


DEPARTMENT OF THE INTERIOR
U.S. GOVERNMENT

R 1-67 Jan. 1967 D.M.

David C. McGlauchlin on left, Roland Koenig on right.

R 1-67 Jan. 1967 D.M.

Marvin "Bud" Boots in foreground, Roland Koenig behind.